INDUCTION OF LABOUR USING PROSTAGLANDIN PESSARIES OF VARYING STRENGTH

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INTRODUCTION

AN ideal method of induction of labour should be simple, safe, effective and non-invasive thereby increasing the acceptance by the patient and reducing the risks associated with amniotomy. The unripe cervix has always been a problem but in recent years prostaglandin E_2 has been shown to have a direct effect on this, possibly by modifying the glyco-amnio glycans in the cervical ground substance.

Over the past few years prostaglandin has been used with varying success rates by differing routes, however its use intravenously and orally has been limited by the side-effects of gastro-intestinal disturbance and local cellulitis at the venopuncture site. Prostaglandin has been administered as a jel extra-amniotically and as a pessary with encouraging results reported in the recent medical literature. Work from Queen Charlotte's Hospital by Shepherd et al. suggests that induction of labour using a 3 mg pessary can be a highly efficient and acceptable procedure. However, it was noted by these authors that a multiparous patient with a favourable cervix had vigorous uterine contractions upon insertion of the pessary. Uterine hypertonus had been noted by us in a higher percentage of cases while using a 3 mg pessary even when the cervix was not particularly favourable. Gordon-Wright and Elder have demonstrated that there is rapid systemic absorption of prostaglandin after administration of the drug in pessary form with a maximum effect in two hours and that the systemic level can remain high for up to six hours—this may explain the cases of hypertonus.

In 1980 Liggins had shown that small amounts of prostaglandins vaginally are also successful in inducing labour—the dose he used was 1/15th of the Queen Charlotte dose—0.2 mg without the risk of hypertonus. This paper presents the results of a study carried out at the Jubilee Maternity Hospital, Belfast comparing 3 mg pessaries on two occasions with lower dose pessaries (2.0 mg and 0.5 mg) administered more frequently in an effort to rationalise the use of this drug and minimise the potential hazard of hypertonic uterine action.

PATIENTS AND METHODS

From the 1st May 1980 all patients at the Jubilee Maternity Hospital requiring induction had prostaglandin pessaries with the exception of four categories:-

(1) Patient or consultant objection
(2) The cervix greater than 3 cms dilated
(3) Patients thought to be at risk of developing fetal distress in labour
(4) The presence of intrauterine death.

Pessaries:

As prostaglandin has a short half life the pessaries were made up in our local pharmacy using a glyceride base (Witepsol)—these have a ward refrigerator life of 5 days. In all, 300 patients were included in the trial and 70 per cent of the inductions were carried out for hypertensive states or post-maturity. The others were carried out for various other medical and obstetrical indications.

The 300 patients were randomly allocated into one of three groups of 100. As seen in Table I the weaker pessaries were inserted more frequently and if labour had not intervened in the stipulated time (24 hours Group A; 48 hours Groups B & C) induction of labour was carried out using amniotomy and syntocinon infusion.

TABLE I

Pessary dose and time of administration

GROUP	A (n = 100)	B (n = 100)	C (n = 100)
PESSARY STRENGTH	3 mg	2 mg	0.5 mg
TIMES	09.00 17.00	09.00 13.00 17.00	09.00 12.00 15.00 18.00 21.00
MAX. NO.	2	6	10

Prior to the insertion of the first pessary the favourability for induction was assessed by means of a modified Bishop score. This takes into account four features regarding the cervix, namely dilatation, length, consistency and position which with the station of the head one can allocate a maximum score of 12 points. A score above 8 is regarded as "favourable" and less than 5 "unfavourable".

After insertion of a pessary the patient remained supine for one hour and thereafter was able to be up and about the antenatal ward. Transfer to the labour ward occurred when the cervix was 4 cms dilated and some patients had augmentation with Syntocinon at the discretion of the Labour Ward Staff. Internal monitoring of labour was used in all but eight of the cases.

RESULTS

There was no significant difference in the three groups with regard to maternal age, weight, height or parity. The gestational age was found to be comparable in all three groups—just over term.

The mean Bishop scores were 5.8, 5.7 and 5.5 respectively. When the outcome of each group was analysed the induction delivery intervals were 15.5 hours, 14.7 hours and 29.5 hours respectively—the 0.5 mg pessaries taking significantly longer ($P > 0.001$). There were significantly fewer patients in Group B (5) who failed to go into established labour after the stipulated time compared with Group A (17) and Group C (24). Of those who went into spontaneous labour with the pessaries

47 per cent in Group A, 38 per cent in Group B and 53 per cent in Group C required augmentation with Syntocinon infusion during labour.

Table II demonstrated the average amounts of prostaglandin used in each group. Significantly less prostaglandin was used in Group C. However, as mentioned above the induction-delivery interval was greatly increased and 24 per cent failed to become established in labour after 48 hours.

TABLE II

Average amounts of prostaglandin required to induce labour

	A (3 mg)	B (2 mg)	C (0.5 mg)
Average number of pessaries	1.6	2.0	5.6
Average PGE_2 (mg)	4.8	4.0	2.5

TABLE III

Mode of Delivery

	A (3 mg)	B (2 mg)	C (0.5 mg)
Normal	81	82	78
Breech	1	—	—
Assisted delivery	9	12	11
Caesarean section	9	6	11
TOTAL	100	100	100

There was no significant difference in the incidence of occipito-posterior position in labour or in the assisted delivery rate. Fewer Caesarean sections were performed in Group B. The number of assisted and operative deliveries carried out for fetal distress was similar in each group (Group A nine; Group B six; Group C eight).

BABIES

Apgar scores were similar in each group with four babies with an initial Apgar score less than 6—three in Group A and one in Group C.

Group A:—Fetal distress: forceps delivery
—Fetal distress: Caesarean section (hypertonus)
—Breech presentation
Group C:—Dysmature fetus

All babies subsequently progressed satisfactorily and there were no perinatal deaths in this selected group of patients.

PATIENT ACCEPTABILITY

In general, the patients were enthusiastic about this method of induction using terms like "more natural" to describe the experience and all multiparae who had labour induced before by amniotomy and syntocinon preferred this method.

Six patients of the 0.5 mg group complained of stinging in the vagina. This has been shown in other centres to be associated with monilial vaginitis, however we had no data to prove this in our series.

Vigorous labour was noted by eight patients in the 3 mg group and two of these cases had definite hypertonus. The first was a para one aged 33 years with a modified Bishop score of two in whom induction was being carried out for prolonged pregnancy. Two hours after insertion of a 3 mg pesary persistent bradycardia in association with a tonic uterine contraction was noted. Preparations were made for delivery by Caesarean section and 20 minutes later, just before operation, it was noted that the cervical dilatation was unchanged and that the tonic uterine contraction persisted. At Caesarean section a male fetus was born weighing 2840 g with an Apgar score of four at one minute and ten at five minutes. The second patient was a para one aged 34 years whose initial Bishop score was four and in whom the second 3 mg prostaglandin pessary was inserted because the cervical dilatation was unchanged. Over the next hour very strong uterine contractions developed and continued until the patient was delivered one and a half hours later. The baby weighed 3280 g and had an Apgar score of five at one minute and nine at five minutes.

DISCUSSION

Vaginal administration of prostaglandin E_2 pessaries has been shown to improve the outcome of induced labour in other centres where it has been used effectively for routine induction of labour. However, the potential advantages which have been put forward enthusiastically have to be balanced by the problems associated with the instability of the preparations used and the variable and sometimes very rapid absorption of prostaglandin. This study was undertaken to determine whether repeated low doses of prostaglandin might be as effective as a higher dose in inducing labour, thereby reducing the risk of unduly rapid progress in labour.

The results suggest that the lowest dose pessary (0.5 mg) given in the manner described is not as effective as one six times this strength (3 mg). Although the low dose pessary was successful in inducing labour in 73 per cent of women in this series (similar to that reported by Liggins), the number of induction failures after 48 hours with this pessary was much higher than when the high dose was used. Also, the overall induction-delivery interval was significantly longer and a small number of patients required excessive analgesia. Because of these factors, the lowest dose pessary cannot be recommended. While the 3 mg pessary is very effective in inducing labour we cannot endorse its use because of the unpredictable risk of vigorous labour and hypertonus encountered in our patients with the consequent risks to both mother and fetus.

The compromise seems to lie with the 2 mg pessary administered four hourly—where one finds the lowest mean induction-delivery interval of 14.7 hours with a significantly lower Caesarean section rate of 6 per cent in the absence of hypertonic uterine action. The mean number of pessaries used in this group is also very low at two. From the practical point of view we now use 2.0 mg pessaries in the manner described routinely in all patients requiring induction of labour where the cervix is less than 3 cms dilated.

While the pessaries are expensive (£5 each) and have a short shelf life, the advantages in our experience seem to outweigh the disadvantages. This easily-

administered, non-invasive method of induction, which ensures the integrity of the membranes, in this dose is relatively free from side-effects and is very acceptable by both staff and patient alike.

It is more physiological in its action and we have halved the Caesarean section rate in induced primigravidas since the method was introduced, bringing the overall hospital rate to under 10 per cent. The problems of inducing labour where the cervix is unfavourable have been greatly reduced at no apparent risk to mother or fetus. We do accept that the use of this drug must be carefully monitored, and we are keeping the matter under constant review.

SUMMARY

Prostaglandin E_2 has been used by varying routes over the past decade to induce labour. Recently, vaginal pessaries have been used as a convenient non-invasive method of inducing labour. However, the risk of uterine hypertonus is still encountered.

A randomised trial is described which aims to ascertain the most effective pessary strength and regimen, while reducing undesirable side effects to a minimum. Our experience suggests that 2 mg pessaries four hourly is the most safe and effective method.

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